

EXERCISES

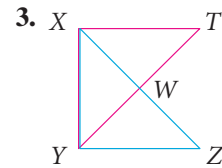
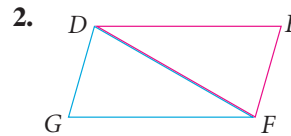
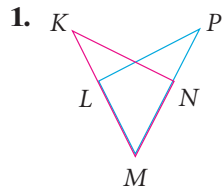
For more practice, see *Extra Practice*.

Practice and Problem Solving

A Practice by Example

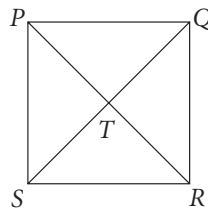
Example 1
(page 224)

In each diagram, the red and blue triangles are congruent. Identify their common side or angle.

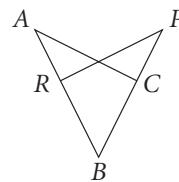


Separate and redraw the indicated triangles. Identify any common angles or sides.

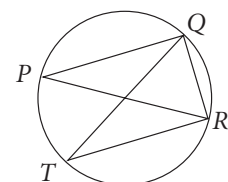
4. $\triangle PQS$ and $\triangle QPR$



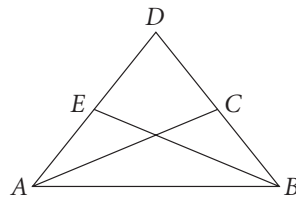
5. $\triangle ACB$ and $\triangle PRB$



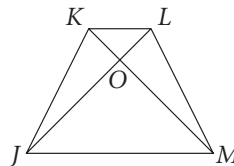
6. $\triangle TRQ$ and $\triangle PQR$



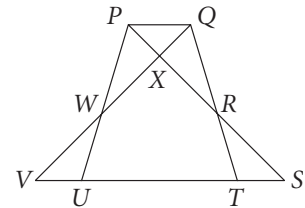
7. $\triangle ABE$ and $\triangle BAC$



8. $\triangle JKL$ and $\triangle MLK$



9. $\triangle PSU$ and $\triangle QVT$

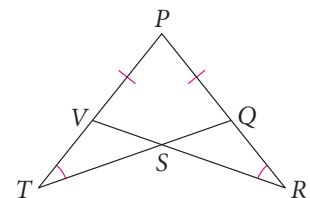
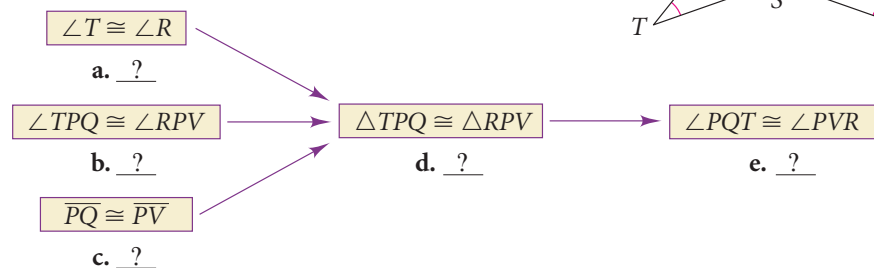


Example 2
(page 225)

10. **Developing Proof** Complete the flow proof.

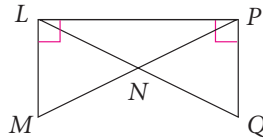
Given: $\angle T \cong \angle R$, $\overline{PQ} \cong \overline{PV}$

Prove: $\angle PQT \cong \angle PVR$

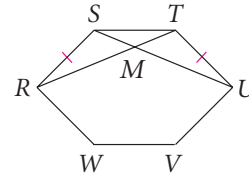


Developing Proof Name a pair of overlapping congruent triangles in each diagram. State whether the triangles are congruent by SSS, SAS, ASA, AAS, or HL.

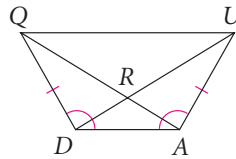
11. Given: $\overline{MP} \cong \overline{QL}$, $\overline{LP} \perp \overline{LM}$,
 $\overline{LP} \perp \overline{PQ}$



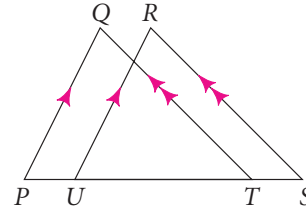
12. Given: $\overline{RS} \cong \overline{UT}$, $\overline{RT} \cong \overline{US}$



13. Given: $\overline{QD} \cong \overline{UA}$,
 $\angle QDA \cong \angle UAD$



14. Given: $\overline{PQ} \parallel \overline{UR}$, $\overline{TQ} \parallel \overline{SR}$,
 $\overline{TQ} \cong \overline{SR}$

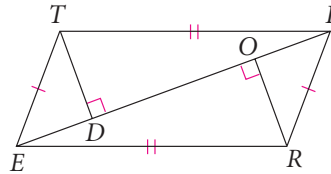


Examples 3, 4
 (pages 225 and 226)

Developing Proof Plan a proof. As part of your plan, separate the overlapping triangles you use.

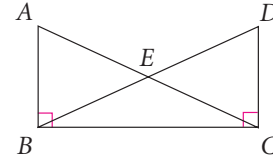
15. Given: $\overline{TE} \cong \overline{RI}$, $\overline{TI} \cong \overline{RE}$,
 $\angle TDI$ and $\angle ROE$ are right \angle s.

Prove: $\overline{TD} \cong \overline{RO}$



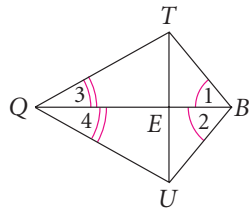
16. Given: $\overline{AB} \perp \overline{BC}$, $\overline{DC} \perp \overline{BC}$,
 $\overline{AC} \cong \overline{DB}$

Prove: $\overline{AE} \cong \overline{DE}$



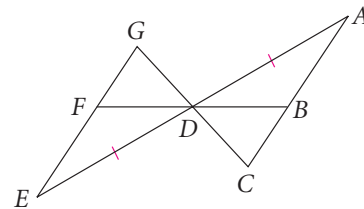
17. Given: $\angle 1 \cong \angle 2$, $\angle 3 \cong \angle 4$

Prove: $\triangle QET \cong \triangle QEU$



18. Given: $\overline{AD} \cong \overline{ED}$,
 D is the midpoint of \overline{BF} .

Prove: $\triangle ADC \cong \triangle EDG$



B Apply Your Skills

Open-Ended Draw the diagram described.

19. Draw a vertical segment on your paper. On the right side of the segment draw two triangles that share the given segment as a common side.
20. Draw an angle. On your angle draw two triangles that have the given angle as a common angle.
21. Draw two regular pentagons, each with its five diagonals.
 - a. In one, shade two triangles that share a common angle.
 - b. In the other, shade two triangles that share a common side.

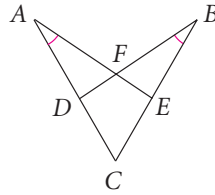
22. Draw two regular hexagons and their diagonals. For these diagrams, do parts (a) and (b) of the preceding exercise.

Proof Name a pair of overlapping congruent triangles in each diagram. State whether the triangles are congruent by SSS, SAS, ASA, AAS, or HL. Plan and write a proof.

23. Given:

$$\overline{AC} \cong \overline{BC},$$

$$\angle A \cong \angle B$$

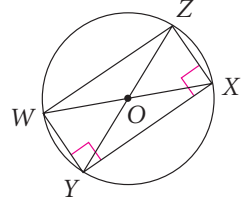


24. Given:

$$\overline{WY} \perp \overline{YX},$$

$$\overline{ZX} \perp \overline{YX},$$

$$\overline{WX} \cong \overline{ZY}$$



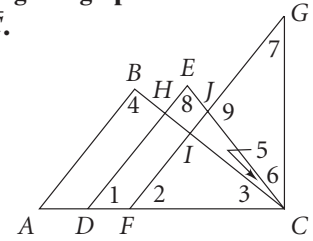
Clothes Design The figure at the right is part of a clothing design pattern.

In the figure, $\overline{AB} \parallel \overline{DE} \parallel \overline{FG}$, $\overline{AB} \perp \overline{BC}$, and $\overline{GC} \perp \overline{AC}$.

$\triangle DEC$ is isosceles with base \overline{DC} , and $m\angle A = 56$.

25. Find the measures of all the numbered angles in the figure.

26. $\overline{AB} \cong \overline{FC}$. Name two congruent triangles and tell how you can prove them congruent.

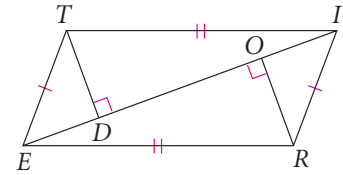


Developing Proof Exercises 27 and 28 are proofs for Exercises 15 and 16. Copy and complete each proof.

Does the proof match your plan?

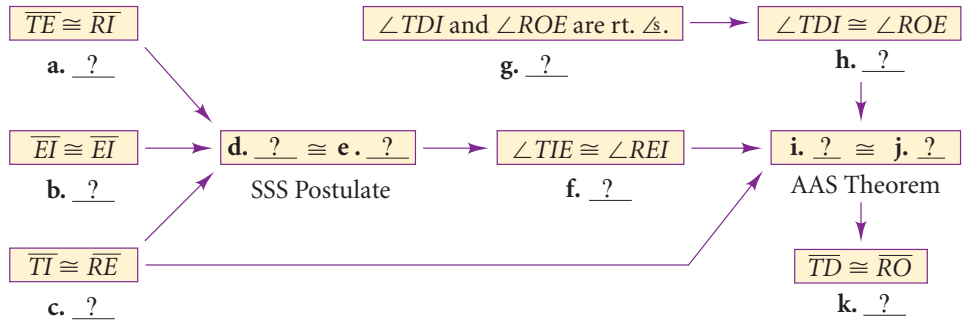
27. Given: $\overline{TE} \cong \overline{RI}$, $\overline{TI} \cong \overline{RE}$,
 $\angle TDI$ and $\angle ROE$ are right angles.

Prove: $\overline{TD} \cong \overline{RO}$

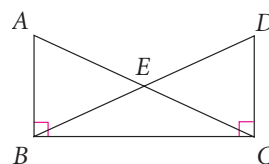


Need Help?

In each of Exercises 27 and 28, use CPCTC twice.



28. **Given:** $\overline{AB} \perp \overline{BC}$, $\overline{DC} \perp \overline{BC}$, $\overline{AC} \cong \overline{DB}$
Prove: $\overline{AE} \cong \overline{DE}$



Statements	Reasons
1. $\overline{AB} \perp \overline{BC}$, $\overline{DC} \perp \overline{BC}$	a. ?
2. $\angle ABC$ and $\angle DCB$ are right angles.	b. ?
3. $\triangle ABC$ and $\triangle DCB$ are right triangles.	c. ?
4. $\overline{AC} \cong \overline{DB}$	d. ?
e. $\underline{\quad} \cong \underline{\quad}$	f. ? Property of Congruence
6. $\triangle ABC \cong \triangle DCB$	g. ?
7. $\angle A \cong \angle D$, $\overline{AB} \cong \overline{DC}$	h. ?
i. $\angle AEB \cong \angle \underline{\quad}$	j. ?
9. $\triangle ABE \cong \triangle DCE$	k. ?
l. $\underline{\quad} \cong \underline{\quad}$	m. ?

Proof Follow your plan for the given Exercise and write a proof.

29. Exercise 17

30. Exercise 18



Challenge

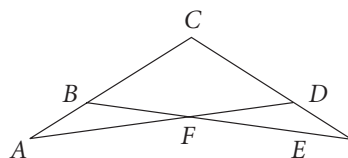
31. **Reasoning** Draw a quadrilateral $ABCD$ with $\overline{AB} \parallel \overline{DC}$ and $\overline{AD} \parallel \overline{BC}$, and its diagonals \overline{AC} and \overline{DB} intersecting at E . Label your diagram to indicate the parallel sides.



- a. List all the pairs of congruent segments that you can find in your diagram.
b. **Writing** Explain how you know that the segments you listed are congruent.

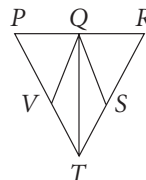
Proof Write a proof.

32. **Given:** $\overline{AC} \cong \overline{EC}$, $\overline{CB} \cong \overline{CD}$
Prove: $\angle A \cong \angle E$



33. **Given:** $\overline{QT} \perp \overline{PR}$, \overline{QT} bisects \overline{PR} ,
 \overline{QT} bisects $\angle VQS$.

Prove: $\overline{VQ} \cong \overline{SQ}$





Standardized Test Prep

Multiple Choice

Use the diagram at the right for Exercises 34–36.

34. If $m\angle KJM = 25$, what is $m\angle LKJ$?

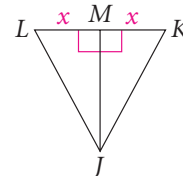
- A. 25 B. 30 C. 65 D. 85

35. If $m\angle KJM = 30$ and $x = 7.4$, what is the perimeter of $\triangle LKJ$?

- F. 44.4 G. 22.2 H. 14.8 I. 7.4

36. If $m\angle LJK = 47$, what is $m\angle LJM$?

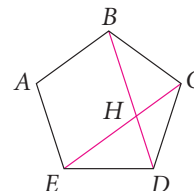
- A. 23.5 B. 25 C. 43 D. 47



Short Response

37. The pentagon at the right is equilateral and equiangular.

- a. What two triangles must be congruent to prove $\overline{HB} \cong \overline{HE}$?
b. Plan a proof to show $\overline{HB} \cong \overline{HE}$.



Extended Response

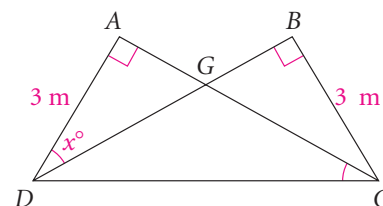
38. a. In the figure at the right, why is $\triangle ACD \cong \triangle BDC$?

b. Copy the figure. Mark each angle that has measure x .

c. What is the value of x ? Explain how you found your answer.

d. What is $m\angle AGB$?

e. What is CD ? Explain your answer.



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Mixed Review

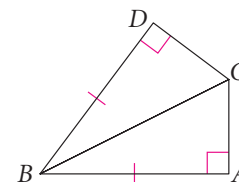
Lesson 4-6

39. Complete the plan for a proof.

Given: $\angle A$ and $\angle D$ are right angles, $\overline{AB} \cong \overline{DB}$.

Prove: $\triangle ABC \cong \triangle DBC$

Plan: $\triangle ABC$ and $\triangle DBC$ are **a.** ? triangles with legs that are given to be **b.** ?. The hypotenuse is congruent to itself by the **c.** ? Property of Congruence. $\triangle ABC \cong \triangle DBC$ by the **d.** ? Theorem.



Lesson 3-7

Constructions Draw a line p and a point M not on p . Construct the described line.

40. line n through M so that $n \perp p$

41. line r through M so that $r \parallel p$

Lesson 3-5

Write an equation in point-slope form of the line that contains the given point and has the given slope.

42. $P(2, -6)$; slope $\frac{1}{2}$

43. $Q(0, 5)$; slope 1

44. $R(-3, 6)$; slope -2

45. $S(0, 0)$; slope $-\frac{1}{3}$

Write an equation in point-slope form of the line that contains the given points.

46. $A(1, 4)$, $B(0, 2)$

47. $E(3, -5)$, $F(6, 0)$

48. $X(-4, -3)$, $Y(2, -8)$